

## VERMONT CONSTRUCTION SPECIFICATION

### 54. GEOTEXTILE FABRIC, WOVEN AND NONWOVEN

#### 1. SCOPE

This work shall consist of furnishing all materials, equipment and labor necessary for the installation of geotextile fabric under access roads, under livestock walkways, under stone fill, preformed concrete blocks, riprap or similar applications.

#### 2. MATERIALS

Prior to installation of any fabric, the contractor shall furnish the landowner a certificate or affidavit that includes the following information:

- a. Name of product and manufacturer.
- b. Product description, chemical composition and a copy of typical laboratory test values.

Geotextiles shall be manufactured from synthetic long chain or continuous polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamide, or polyvinylidene chloride. The geotextile shall be formed into a stable network of filaments or yarn that retain their relative position to each other, are inert to commonly encountered chemicals and are resistant to ultraviolet light, heat, hydrocarbons, mildew, rodents and insects. The geotextile shall be free of any chemical treatment or coating that might significantly reduce its permeability and shall have no flaws or defects that significantly alter its physical properties. The geotextile shall be exposed to ultraviolet radiation (sunlight) for no more than 15 days total in the period of time following manufacture until the fabric is covered with soil, rock, concrete, etc. Unless otherwise specified, the requirements for materials are as follows:

##### a. Woven Geotextile

Woven geotextile shall conform to the physical properties listed in Table 1. The woven geotextile shall be manufactured from monofilament yarn that is woven into a uniform pattern with distinct and measurable openings. The fabric shall be manufactured so that the yarns will retain their relative position with regard to each other. Yarn composition shall be at least 85% by weight of propylene, ethylene, or vinylidene chloride and shall contain stabilizers and/or inhibitors to enhance its resistance to ultraviolet or heat exposure. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.

##### b. Nonwoven Geotextile

Nonwoven geotextile shall conform to the physical properties listed in Table 2. Nonwoven geotextile shall be manufactured from randomly oriented fibers bonded together by the needle-punched process. In addition, one side may be slightly heat bonded.

(Note: Non-needle punched, heat bonded nonwoven may be used for Class IV in Table 2.)

### 3. SHIPMENT, STORAGE AND CERTIFICATION

The geotextile fabric shall be supplied in rolls wrapped with a protective covering to keep out mud, dirt, dust, debris and direct sunlight. The fabric shall be free of defects which measurably alter its physical properties and planned function. Each roll of fabric shall be clearly marked to identify the individual production run.

The geotextile shall be shipped in rolls wrapped with a protective covering to keep out mud, dirt, dust, debris and direct sunlight. Each roll of geotextile shall be clearly marked to identify the brand, type and the individual production run.

(See ASTM D4873, Standard Guide for Identification, Storage and Handling of Geotextiles.)

The geotextile shall meet the specified requirements (Table 1 or 2) for the product style or type shown on the label. Product properties as listed in the "Specifiers Guide" (latest issue), Geotechnical Fabrics Report, Industrial Fabrics Association International, 345 Cedar Bldg., Suite 450, St. Paul, Minnesota 55101, and that represent minimum average roll values, will be acceptable documentation that the product style or type meets these specified requirements.

For products that do not appear in the above directory, or do not have minimum average roll values listed, typical test data from the identified production run of the fabric will be required for each of the specified tests (Table 1 or 2).

All geotextiles will be subject to sampling and testing by qualified testing laboratories at any time from initial site delivery until final installation.

### 4. PLACEMENT

The geotextile fabric shall be placed on the approved prepared surface at the locations and in accordance with the details shown on the drawings. The fabric shall be unrolled along the placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when the stone or other material is placed. No cuts will be permitted in the fabric panel unless otherwise specified. The panel may be folded and overlapped to permit proper placement in the designated areas. The fabric will be rejected at the time of placement if it has defects, rips, holes, flaws, deterioration or damage that occurred during manufacture, transportation, storage or installation.

The orientation of the width and length of the fabric panels shall be as shown on the drawings. The fabric length shall be placed parallel to the direction of water flow unless otherwise indicated on the drawings. The overlaps of panels and end roll details shall be as on the drawings. The minimum overlap shall be 18 inches (24 inches for installation under gabions). When specified on the drawings, the seams of the cloth shall be machine sewn with thread of a material meeting the chemical requirements given for plastic yarn. The sheets of fabric shall be sewn together at the factory or another approved location to form panels of specified size.

Securing pins, approved and provided by the fabric manufacturer, shall be placed along the edge of the panel to adequately secure the fabric during placement. At vertical laps, securing pins shall be inserted through both layers along a line through the approximate midpoint of the overlap. At horizontal laps, securing pins shall be inserted through the bottom layer only. Securing pins shall be placed along a line approximately two inches in from the edge of the outer limits of the completed filter fabric area at intervals recommended by the manufacturer but not greater than 12 feet. Additional pins shall be installed as necessary to prevent any slippage of the fabric, regardless of location. The use of securing pins will be held to the minimum necessary. The fabric may be secured with other methods when specified.

Unless otherwise specified by the manufacturer, securing pins shall be steel or fiberglass and formed as a "U", "L", or "T" shape or contain "ears" to prevent total penetration. Steel washers shall be provided on all but the "U" shaped pins.

The geotextile fabric shall not be placed until the cover material is on site and ready to install within the same working day.

Cover material shall be placed in a manner that prevents damage to the fabric. In no case shall the cover material be dropped on uncovered fabric from a height greater than three feet.

TABLE 1  
REQUIREMENTS FOR WOVEN GEOTEXTILES

Property	Test Method	Class I	Class II & III	Class IV
Tensile Strength <sup>1</sup>	ASTM D4632 Grab Test Method	200 lbs. minimum in any principal direction	120 lbs. minimum in any principal direction	150 lbs. minimum in any principal direction
Bursting Strength <sup>1</sup>	ASTM D3786 Diaphragm Tester	450 psi minimum	300 psi minimum	250 psi minimum
Elongation Failure <sup>1</sup>	ASTM D4632	35% maximum	35% maximum	35% maximum
Puncture	ASTM D4833	100 lbs.	55 lbs	60 lbs.
Ultraviolet Light Resistance	ASTM D4355 500 hrs. exposure	70% minimum tensile strength retained	70% minimum tensile strength retained	70% minimum tensile strength retained
Apparent Opening Size (AOS)	ASTM D4751	As specified with a minimum size #100 <sup>1</sup>	As specified with a minimum size #100 <sup>2</sup>	As specified with a minimum size #100 <sup>2</sup>
Percent Open Area	CWO-02215-86	4.0% minimum	4.0% minimum	4.0% minimum

<sup>1</sup> Minimum average roll value (weakest principal direction).

<sup>2</sup> U.S. standard sieve size.

TABLE 2  
REQUIREMENTS FOR NONWOVEN GEOTEXTILES

Property	Test Method	Class I	Class II	Class III	Class IV <sup>3</sup>
Tensile Strength <sup>1</sup>	ASTM D4632 Grab Test Method	180 lbs. Minimum	120 lbs. minimum	90 lbs. minimum	120 lbs. minimum
Bursting Strength <sup>1</sup>	ASTM D3786 Diaphragm Tester	320 psi minimum	210 psi minimum	180 psi minimum	210 psi minimum
Elongation Failure <sup>1</sup>	ASTM D4632	100% maximum	100% maximum	100% maximum	100% maximum
Puncture <sup>1</sup>	ASTM D4833	80 lbs.	40 lbs	35 lbs	50 lbs.
Ultraviolet Light Resistance	ASTM D4355 500 hrs. exposure	70% minimum tensile strength retained	70% minimum tensile strength retained	70% minimum tensile strength retained	70% minimum tensile strength retained
Apparent Opening Size (AOS)	ASTM D4751	Size #40 maximum <sup>2</sup>	Size #40 maximum <sup>2</sup>	Size #40 maximum <sup>2</sup>	Size #40 maximum <sup>2</sup>
Permittivity	ASTM D4491	0.70	0.70	0.70	0.30

<sup>1</sup> Minimum average roll value (weakest principal direction).

<sup>2</sup> U.S. standard sieve size.

<sup>3</sup> A heat-bonded (non-needle punched) nonwoven fabric may be used for this class.